

Application No.: 10/633,182
Amendment Dated July 23, 2007
Reply to Office Action of March 22, 2007

REMARKS/ARGUMENTS

Independent Claims 1 and 5 have been amended to more clearly define the location of the pressure gage. In particular, claims 1 and 5 have been amended to recite "a pressure gage operatively positioned for detecting the pressure between the stator blade and the moving blade." Support for these amendments is found throughout the application, such at paragraph [0023] of the published application, namely U.S. Publication No. 2004/0055626.

I. Rejections under 35 U.S.C. 103(a)

To establish a *prima facie* case of obviousness the prior art references must teach or suggest all claim limitations. Not one of the cited references teaches or suggests "a pressure gage operatively positioned for detecting the pressure between the stator blade and the moving blade." As such, any combination of the cited references also fails to teach or suggest a pressure gage positioned between a stator blade and a moving blade. Accordingly, the Examiner has failed to prove a *prima facie* case of obviousness because the references cited do not teach or suggest each and every claimed limitation.

A. Rejection of Claims 1-3

Claims 1-3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over JP 60-69214 to Hibara (hereinafter "Hibara") in view of U.S. Patent No. 4,548,040 to Miller et al. (hereinafter "Miller"). The Office argues that "it would have been obvious to one of ordinary skill in the art to modify Hibara with Miller for the benefit of the efficient control of the cleaning operation which allows the turbine to continue running during cleaning and operates only when necessary." However, the combination of Hibara and Miller does not result in the currently claimed invention because both Hibara and Miller fail to teach or suggest a pressure gage operatively positioned for detecting the pressure between the stator blade and the moving blade as recited in independent claim 1. As such, any combination of the two also fails to teach or suggest a pressure gage operatively positioned for detecting the pressure between the stator blade and the moving blade as recited in independent claim 1

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Hibara merely teaches a specific nozzle for the spouting of pressurized water to prevent adhesion of scale build up in a turbine, not the details of a turbine itself. More specifically, Hibara teaches a nozzle configuration for discharging pressurized water having a water introducing hole 3 and a “spouting out” hole 4 bored from the ventral surface of the nozzle. However, Hibara is silent regarding an extraneous matter removing system including a pressure gage operatively positioned for detecting the pressure between a stator blade and a moving blade as recited in claim 1. As such, Hibara necessarily does not teach or suggest each and every element of the currently claimed invention.

Miller is directed to an apparatus for controlling the cleaning of turbine blades of the turbine portion of a turbocharger powered by exhaust gas and a method of determining when to initiate a water injection system to supply high pressure water to the exhaust gas powering the turbocharger to clean the turbine blades by monitoring the performance of the compressor portion of the turbocharger. See abstract. More specifically, exhaust gas exits an engine 80 and enters the turbine section 31 of the turbocharger 10 via gas inlet 32. The exhaust gas then passes over a vane 36 and stator 38 before engaging the turbine blades 40 mounted on a turbine disc 42. After the exhaust gas passes through the turbine disk 42, it is discharged from the turbocharger. Further, the turbine disc 42 is secured to a shaft 22. The other end of the shaft 22 is attached to an impeller 14 within the compressor section 11 of the turbocharger 10. Thus, when the exhaust air causes the rotation of the moving blades 40, impeller 14 of the compressor section 11 also rotates. As such, fresh air is pulled into the compressor section 11 of the turbocharger 10 via air intake 12. The incoming air is compressed, received in a collector 18 and ultimately discharged through an air discharge 20 from the compressor section 11 to the engine 80 via conduit 50. Miller teaches positioning a pressure transducer 54 to monitor the pressure of the air being discharged through discharge 20. See column 3 and Figure 1. When the pressure of the air passing through the discharge 20 drops, the pressure transducer 54 senses this pressure drop and water injectors 70 inject water directly into the exhaust gas stream upstream from the vanes and stators of the turbocharger. At no point does Miller illustrate or suggest the desirability of including and/or moving a pressure transducer to be operatively positioned for detecting the pressure between the stator blade 38 and the moving blade 40.

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To the contrary, the currently claimed invention includes a pressure gage operatively positioned for detecting the pressure between the stator blade 2 and the moving blade 3. This location is actually the very place where extraneous matter adheres. An increase of the nozzle stage after pressure (i.e. pressure at the after stage of the stator blade 2) represents an actual adhesion of extraneous matter. By contrast, the systems contemplated by Miller merely indicate a decrease in performance of a turbocharger, which is not necessarily indicative of the turbine blades becoming dirty or fouled. In particular, a pressure drop sensed by the pressure transducer 54 monitoring the pressure of the air being discharged through discharge 20 can often times be attributed to causes other than turbine blade fouling. For example, the decreased air pressure of air discharged through discharge 20 can also be attributed a decline in the performance of the turbine itself and/or the turbocharger, an increase of mechanical loss of bearing, and reduction of the temperature and/or reduction of the flow rate of the high temperature gas. As such, systems contemplated by Miller will very likely inject water unnecessarily and exacerbate erosion of the moving blade of the turbine and lead to a harmful effect on mechanical strength of the blade. However, since the currently claimed invention includes a pressure gage operatively positioned for detecting the pressure were extraneous matter actually adheres, namely between the stator blade 2 and the moving blade 3, the currently claimed invention provides a system in which the injection of water unnecessarily and exacerbation of erosion of the moving blade of the turbine leading to a harmful effect on mechanical strength of the blade is avoided.

Since both Hibara and Miller do not teach or suggest “a pressure gage operatively positioned for detecting the pressure between the stator blade and the moving blade,” any combination of Hibara and Miller also does not teach or suggest a pressure gage positioned between a stator blade and a moving blade as recited in Claim 1 or any claims dependent thereon. Since the combination of the cited references does not teach or suggest all elements as currently claimed, it is respectfully submitted that the rejections of Claims 1-3 under 35 U.S.C. 103(a) have been overcome. Applicant requests, for at least the reasons stated above, withdrawal of this rejection.

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B. Rejection of Claim 5

Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Miller. Miller is discussed in detail above.

As currently claimed, claim 5 also recites a pressure gage operatively positioned for detecting the pressure between the stator blade and the moving blade. For the reasons set forth above regarding Miller, Applicant submits that the rejection of Claim 5 under 35 U.S.C. 103(a) have been overcome. Applicant requests, for at least the reasons stated above, withdrawal of this rejection.

C. Rejection of Claims 4 and 6-7

Claim 4 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Hibara and Miller, and further in view of U.S. Patent No. 4,384,452 to Rice (hereinafter “Rice”). Claims 6-7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of Rice. Claim 4 is dependent upon claim 1 and claims 6 and 7 are dependent upon claim 5. Both claim 1 and 5 recite a pressure gage operatively positioned for detecting the pressure between a stator blade and a moving blade. Accordingly, dependent claims 4, 6 and 7 also currently recite this element.

In general, Rice is directed to a gas turbine using steam as a blade coolant instead of air. Rice teaches that steam is a superior coolant than air due to its preferred physical properties such as its thermal conductivity, specific heat, lower viscosity etc... Rice also teaches that hot corrosion is a concern due to the elevated temperatures of gas turbines. Providing a steam blanket over much of the blades as taught in Rice protects the steam covered areas (sections of the blades) from direct contact with the corrosive products of combustion. However, Rice teaches that a steam blanket cannot adequately protect the leading edges of the blades and therefore require a protective coating from the heat of the moving fluid. Accordingly, Rice teaches the use of protective coatings on leading edges because they are not adequately covered by the steam coolant.

Similar to Hibara and Miller, Rice fails to teach or suggest every element of the currently claimed invention. Specifically, Rice also fails to teach or suggest a pressure gage operatively positioned for detecting the pressure between a stator blade and a moving blade. As such, Rice

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does not teach or suggest each and every element of Claims 1 and 5 or any claims dependent thereon (Claims 4, 6 and 7).

For these and the other reasons stated above, it is respectfully submitted that the rejections of Claims 4, 6 and 7 under 35 U.S.C. §103 (a) have been overcome. Applicant requests withdrawal of these rejections.

II. Conclusion

In view of the current claim amendments and the foregoing remarks, Applicant submits that the pending claims are in condition for allowance. Applicant respectfully requests that the claims be allowed to issue. If the Examiner wishes to discuss the application or the comments herein, the Examiner is urged to contact the undersigned.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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